

CLAIMS

1. A base station that constitutes a wireless LAN system realizing band-widening using a plurality of communication channels, the base station comprising:

5 a plurality of physical layers corresponding to the plurality of communication channels, and each that transmits and receives a radio signal conforming to an IEEE 802.11 standard using a corresponding communication channel; and

10 a media access control (hereinafter, "MAC"),
when transmitting, that divides an entire data frame conforming to the IEEE 802.11 standard from a head of the data frame, in accordance with a transmission rate of each physical layer, and allots the divided data frame to
15 the physical layers so that burst times of the communications channels are equal, and

when receiving, that combines data frames received via a plurality of communication channels through operations opposite to those performed when transmitting.

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2. A base station that constitutes a wireless LAN system realizing band-widening using a plurality of communication channels, the base station comprising:

25 a plurality of physical layers corresponding to the plurality of communication channels, and each that transmits and receives a radio signal conforming to an IEEE 802.11 standard using a corresponding communication channel; and

30 a media access control (hereinafter, "MAC"),
when transmitting, that divides a part of a data frame conforming to the IEEE 802.11 standard from a head of the part of the data frame, in accordance with a transmission rate of each physical layer, and allots the

divided part of the data frame to the physical layers so that burst times of the communications channels are equal, and

when receiving, that combines data frames
5 received via a plurality of communication channels through operations opposite to those performed when transmitting.

3. The base station according to claim 1, further comprising:

10 a determining unit that determines the transmission rate of each communication channel, a frame allotment ratio between the communication channels, and a transmission data amount in each communication channel, for the MAC to carry out the allotment and the combination corresponding to the
15 plurality of communication channels.

4. The base station according to claim 2, further comprising:

a determining unit that determines the transmission
20 rate of each communication channel, a frame allotment ratio between the communication channels, and a transmission data amount in each communication channel, for the MAC to carry out the allotment and the combination corresponding to the plurality of communication channels.

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5. The base station according to claim 1, further comprising:

a protocol control unit conforming to an IEEE 802.11 standard and using a carrier sense multiple
30 access/collision avoidance (CSMA/CA) protocol.

6. The base station according to claim 2, further comprising:

a protocol control unit conforming to an IEEE 802.11 standard and using a carrier sense multiple access/collision avoidance (CSMA/CA) protocol.

- 5 7. The base station according to claim 1, wherein
 for transmission, a frame having a frame length
 shorter than that of the data frame is not divided and the
 same frame having a same rate is transmitted to each
 communication channel, and
10 for reception, if one frame having a frame length
 shorter than that of the data frame is received normally,
 the received one frame is recognized as a frame transmitted
 from a transmission side.
- 15 8. The base station according to claim 2, wherein
 for transmission, a frame having a frame length
 shorter than that of the data frame is not divided and the
 same frame having a same rate is transmitted to each
 communication channel, and
20 for reception, if one frame having a frame length
 shorter than that of the data frame is received normally,
 the received one frame is recognized as a frame transmitted
 from a transmission side.
- 25 9. A radio terminal that constitutes a wireless LAN
 system realizing band-widening using a plurality of
 communication channels, the base station comprising:
 a plurality of physical layers corresponding to the
 plurality of communication channels, and each that
30 transmits and receives a radio signal conforming to an IEEE
 802.11 standard using a corresponding communication
 channel; and
 a media access control (hereinafter, "MAC"),

when transmitting, that divides an entire data frame conforming to the IEEE 802.11 standard from a head of the data frame, in accordance with a transmission rate of each physical layer, and allots the divided data frame to the physical layers so that burst times of the communications channels are equal, and

when receiving, that combines data frames received via a plurality of communication channels through operations opposite to those performed when transmitting.

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10. A radio terminal that constitutes a wireless LAN system realizing band-widening using a plurality of communication channels, the base station comprising:

a plurality of physical layers corresponding to the plurality of communication channels, and each that transmits and receives a radio signal conforming to an IEEE 802.11 standard using a corresponding communication channel; and

a media access control (hereinafter, "MAC"),

when transmitting, that divides a part of a data frame conforming to the IEEE 802.11 standard from a head of the part of the data frame, in accordance with a transmission rate of each physical layer, and allots the divided part of the data frame to the physical layers so that burst times of the communications channels are equal, and

when receiving, that combines data frames received via a plurality of communication channels through operations opposite to those performed when transmitting.

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11. The radio terminal according to claim 9, further comprising:

a determining unit that determines the transmission

rate of each communication channel, a frame allotment ratio between the communication channels, and a transmission data amount in each communication channel, for the MAC to carry out the allotment and the combination corresponding to the plurality of communication channels.

12. The radio terminal according to claim 10, further comprising:

a determining unit that determines the transmission rate of each communication channel, a frame allotment ratio between the communication channels, and a transmission data amount in each communication channel, for the MAC to carry out the allotment and the combination corresponding to the plurality of communication channels.

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13. The radio terminal according to claim 9, further comprising:

a protocol control unit conforming to an IEEE 802.11 standard and using a carrier sense multiple access/collision avoidance (CSMA/CA) protocol.

14. The radio terminal according to claim 10, further comprising:

a protocol control unit conforming to an IEEE 802.11 standard and using a carrier sense multiple access/collision avoidance (CSMA/CA) protocol.

15. The radio terminal according to claim 9, wherein

for transmission, a frame having a frame length shorter than that of the data frame is not divided and the same frame having a same rate is transmitted to each communication channel, and

for reception, if one frame having a frame length

shorter than that of the data frame is received normally, the received one frame is recognized as a frame transmitted from a transmission side.

- 5 16. The radio terminal according to claim 10, wherein
for transmission, a frame having a frame length
shorter than that of the data frame is not divided and the
same frame having a same rate is transmitted to each
communication channel, and
10 for reception, if one frame having a frame length
shorter than that of the data frame is received normally,
the received one frame is recognized as a frame transmitted
from a transmission side.
- 15 17. The base station according to claim 1, wherein
if a number of communication channels used is one, the
division and the combination are not carried out, and the
physical layer corresponding to the used communication
terminal transmits and receives the radio signal conforming
20 to the IEEE 802.11 standard.
18. The base station according to claim 2, wherein
if a number of communication channels used is one, the
division and the combination are not carried out, and the
25 physical layer corresponding to the used communication
terminal transmits and receives the radio signal conforming
to the IEEE 802.11 standard.
19. The base station according to claim 1, wherein
30 equal frames are allowed to be transmitted
simultaneously using the plurality of communication
channels.

20. The base station according to claim 2, wherein equal frames are allowed to be transmitted simultaneously using the plurality of communication channels.

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21. The base station according to claim 1, further comprising:

a protocol control unit conforming to an IEEE 802.11 standard and using a polling control.

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22. The base station according to claim 2, further comprising:

a protocol control unit conforming to an IEEE 802.11 standard and using a polling control.

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23. The base station according to claim 1, wherein the plurality of communication channels are selectable according to a frequency, a space, or a combination of the frequency and the space.

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24. The base station according to claim 2, wherein the plurality of communication channels are selectable according to a frequency, a space, or a combination of the frequency and the space.

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25. The base station according to claim 1, wherein if the plurality of communication channels are used, a division number, a total number of divisions, a Pad insertion method, and information indicating whether a same frame is copied for the plurality of communication channels are included in the data frame.

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26. The base station according to claim 2, wherein

if the plurality of communication channels are used, a division number, a total number of divisions, a Pad insertion method, and information indicating whether a same frame is copied for the plurality of communication channels
5 are included in the data frame.

27. The radio terminal according to claim 9, wherein
if a number of communication channels used is one, the division and the combination are not carried out, and the
10 physical layer corresponding to the used communication terminal transmits and receives the radio signal conforming to the IEEE 802.11 standard.

28. The radio terminal according to claim 10, wherein
15 if a number of communication channels used is one, the division and the combination are not carried out, and the physical layer corresponding to the used communication terminal transmits and receives the radio signal conforming to the IEEE 802.11 standard.

20 29. The radio terminal according to claim 9, wherein
equal frames are allowed to be transmitted simultaneously using the plurality of communication channels.

25 30. The radio terminal according to claim 10, wherein
equal frames are allowed to be transmitted simultaneously using the plurality of communication channels.

30 31. The radio terminal according to claim 9, further comprising:

a protocol control unit conforming to an IEEE 802.11

standard and using a polling control.

32. The radio terminal according to claim 10, further comprising:

- 5 a protocol control unit conforming to an IEEE 802.11 standard and using a polling control.

33. The radio terminal according to claim 9, wherein
the plurality of communication channels are selectable
10 according to a frequency, a space, or a combination of the frequency and the space.

34. The radio terminal according to claim 10, wherein
the plurality of communication channels are selectable
15 according to a frequency, a space, or a combination of the frequency and the space.

35. The radio terminal according to claim 9, wherein
if the plurality of communication channels are used, a
20 division number, a total number of divisions, a Pad insertion method, and information indicating whether a same frame is copied for the plurality of communication channels are included in the data frame.

25 36. The radio terminal according to claim 10, wherein
if the plurality of communication channels are used, a division number, a total number of divisions, a Pad insertion method, and information indicating whether a same frame is copied for the plurality of communication channels
30 are included in the data frame.